Notes:

1. The Home Depot Racking Standards (THDRS) apply to installation of new racking components and replacement of damaged racking components in all existing stores, new stores, remodels and resets.
2. This document may not be reflective of the exact components in your store. Only replace or repair existing rack (i.e. uprights, beams, etc.) only if components are significantly damaged as defined in this document. Do not replace or upgrade undamaged components solely for the purpose of meeting current standards. Replace any undamaged, noncompliant components as bays are refreshed or changed through Merchandising Projects.
3. A racking engineering professional, local code authorities and racking manufacturers may exceed THDRS rules.
4. It is THD policy to store pallets only on 42" deep or deeper rack.
5. To report a racking-related emergency submit a ticket in Service Channel/FixIt and contact RackingMaintenance@homedepot.com
6. To request pallet rack and cantilever maintenance navigate to FM Pilot via **MyApron>>The Workbench>>Application>>Fix-it 3.0** or through the application on the HD phone

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1 Introduction & Scope of Standards

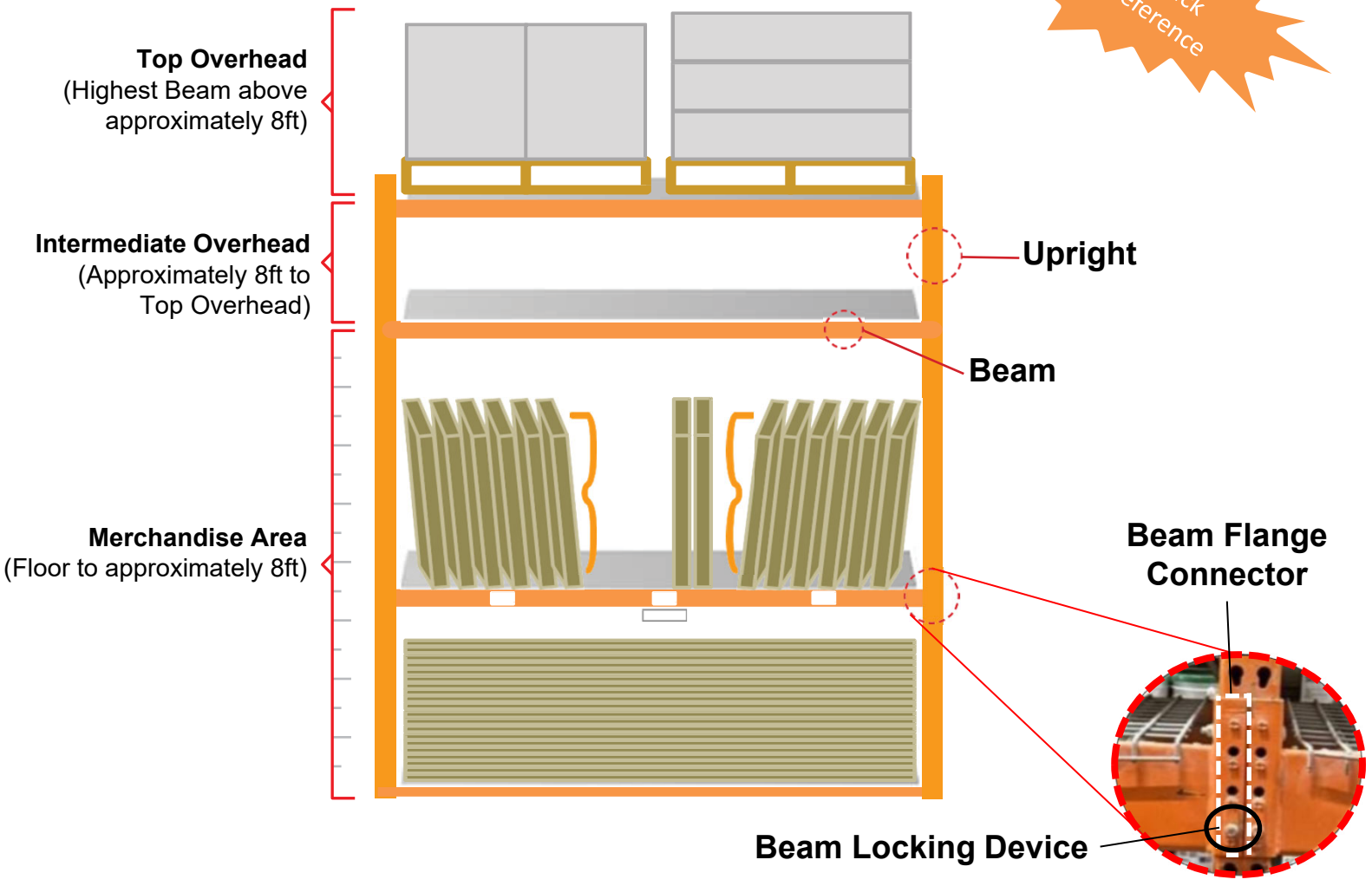
This preliminary racking standard provides the minimum design and installation requirements for new racking to be installed in existing stores, store modifications to existing racking that deviate from the original design documentation, recommended maintenance to prevent damage and deterioration that warrant repair, and general repair recommendations. The Subsections below describe the types of racks covered under this standard and the guidance used to develop this standard.

1.1 Types of Racks and Definitions

This section defines the types of racks covered under this standard; levels of damage; and qualified personnel for installing, assessing, and repairing racks.

1.2 Racking System Components

Quick Reference



1.2 Racking System Components
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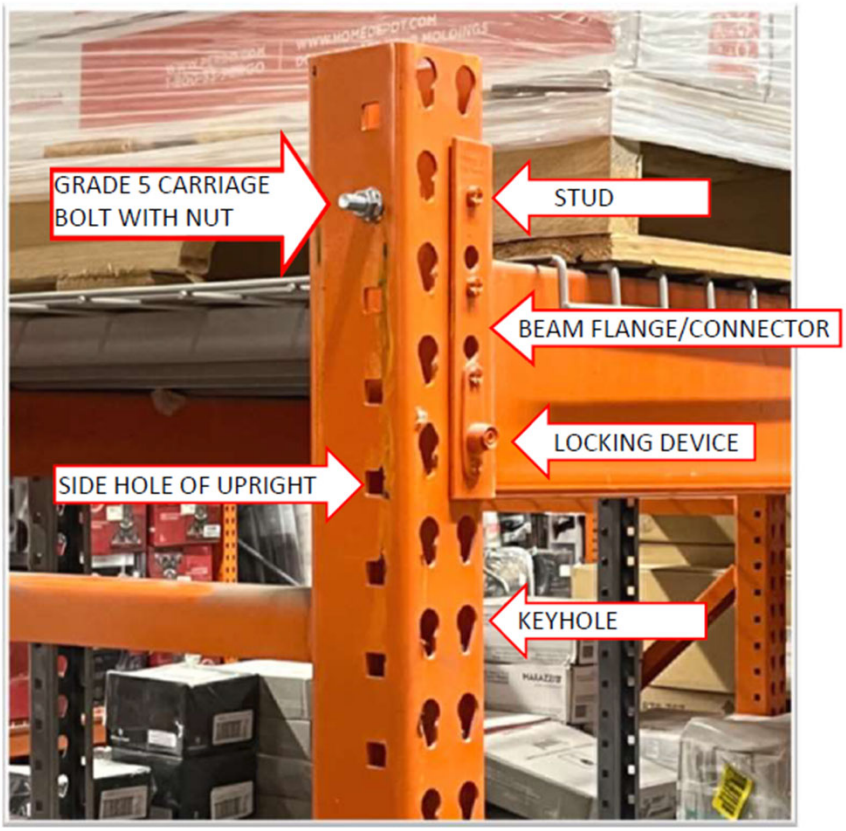
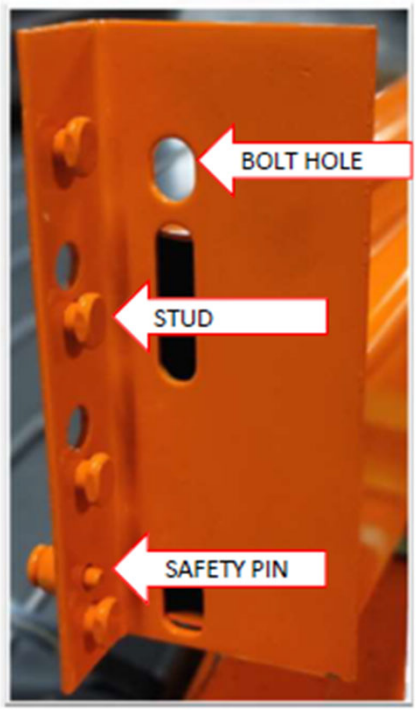
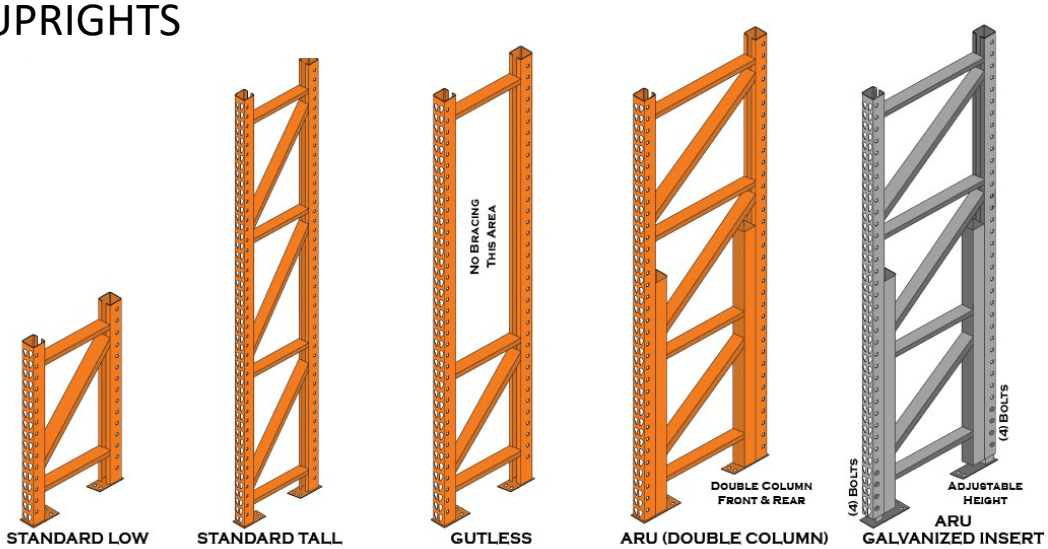


BEAM TO UPRIGHT CONNECTION



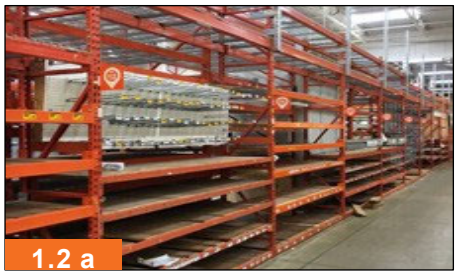
BEAM FLANGE / CONNECTOR REAR VIEW

UPRIGHTS

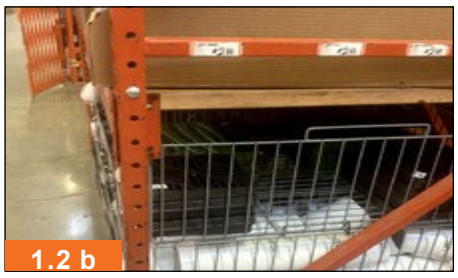


1.2 Racking System Components —Continued

a. **Upright** – A vertical structural column of a racking frame. The beams of the rack are attached to the columns and transfer the loads to these columns.


1.2 a

b. **Light Duty Uprights** – These racks are designed to hold smaller product displays and boxes. These uprights are not orderable and not used in new applications in stores. If a Light Duty upright is significantly damaged it is replaced with a similarly dimensioned Heavy Duty Upright or Abuse Resistant Upright (ARU) depending on the depth.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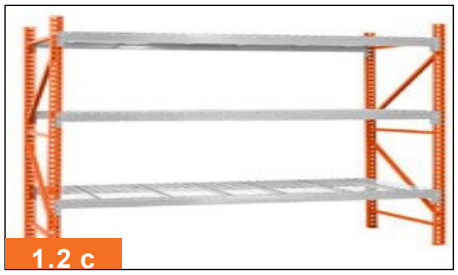
c. **H-Frame or Pallet Racking: Heavy Duty Uprights/HD Uprights** (also known as **Single Post Uprights**) – These racks are used to hold smaller product displays and boxes.


1.2 c

d. **H-Frame or Pallet Racking: Abuse Resistant Uprights/ARU** (also known as Double Post Uprights) – These racks are designed to hold heavy pallets, typically in the building materials, outdoor garden, and flooring areas.

1.2 d

e. **Cantilevered Lumber Rack** – A rack structure that includes mainly vertical columns, extended bases, horizontal arms projecting from the face of the columns, and horizontal bracing between the columns.

1.2 e

f. **Gutless Racking Upright** – an open area on an upright with no bracing.

1.2 f

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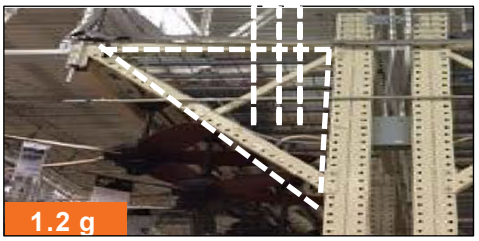
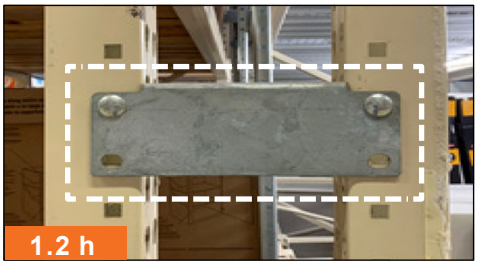
1.2 Racking System Components —Continued

g. **V Racking** – a racking upright system created by adding a Fan V Rack to a specialized upright.



h. **Row Spacers** – A bracing system used to connect the rear racking uprights together for stability, typically mounted at multiple levels on the uprights.



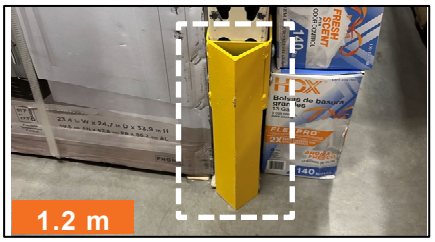
i. **Beam Locking Device** – A pin, bolt, or other mechanism that positively engages the racking structure to prevent disengagement of the connector to the column.

j. **Unit Load** – The total weight expected to be positioned in the rack (product load and pallet weight).

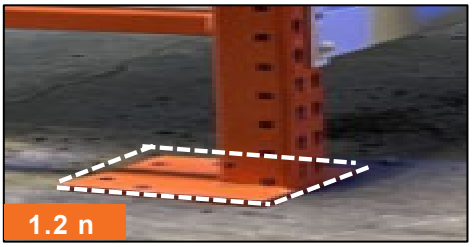
k. **Pallet Stop** – a vertical component attached to the backside of shelf levels used to prevent pallets from extending into the flue space between racks (see Chapter 6 for more details).

l. **Flange / Beam Flange Connector** – Plate that connects the beam to the upright.

m. **Column Protector** – Attachment to the front of the upright to prevent rack damage cause by lift equipment.



n. **Base Plate**– Plate at the foot of the racking upright. Stores may have either standard or seismic base plate.



1.3 Levels of Rack Damage

a. **Moderate** – Structural deflection though not obviously severe; does not warrant immediate action. Damage should be protected from further damage and monitored.

b. **Severe** – Structural damage that compromises the integrity of the racking system. Upon identification, block area and contact store leadership to partner with the appropriate teams for determining the safest and best process for unloading the rack. Place a service request for assessment, repair, or replacement before putting the rack back into use. Exception – a store associate can replace a severely damaged beam or wire decking, as well as replace missing bolts or j-pins.

1.4 How to Handle Racking Damage

a. Only authorized contractors are allowed to repair and replace racking uprights over 4 ft tall.

b. Separate associates and customers from area.

c. Submit a FixIt ticket and contact your DAPM.

d. If repair cannot be done immediately, tag out of service and identify with caution tape or place a **"NO STORAGE"** sign on the area until the repairs can be completed.

Quick Reference

2.1 General Notes

2.1.1

2.1.1. Modifying or altering horizontal or diagonal struts (i.e. “H” or “Z” bracing) on pallet racking is prohibited, including, but not limited to welding, cutting, drilling or self-tapping

2.1.2. **It is not permissible to drill holes or self-tapping metal screws to racking components, including uprights, beams, cross braces, and base plates.**

a. Only upright extender insert sleeves are allowed to be drilled through for purposes of allowing beam bolts or j-pins to fit.

2.1.2.a

2.1.3. In the event of severe damage, pallet racking must be unloaded until a Qualified Contractor can repair or replace it. To report damage or maintenance issues refer to page 1, lines 5 and 6.

2.1.4. For fire safety purposes, all back-to-back pallet racking (except V-Rack) that is 96“ (8’-0“) tall or taller are to have two row spacers per pair of back-to-back uprights that are in alignment. Place the two spacers the approximate distance from the top and bottom of each upright as outlined below:

Table No. 1

Height:	Approximate Distance:
16'-0"	48"
12'-0"	36"
8'-0" and lower	1 row spacer at 2/3rds the distance up from the bottom

2.1.4

2.1.5. Lighting/Fan V-rack requires a minimum of three row spacers (or as defined by manufacturer): one within 12" off the floor, one in the middle of the upright, and one within the top 12" of the upright. **Only hand-stacked product can be stored on top of V-racking – no pallet storage – no exceptions.**

2.1.5

2.1.6. Never tie endcaps to adjacent racks. Keep at least 3" clearance between the endcap upright and the racks behind it.

2.2 Heavy Duty Uprights

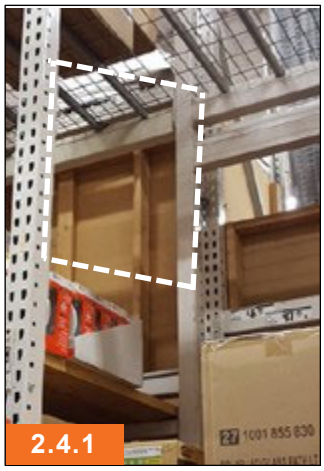
2.2.1. Heavy Duty Uprights (3"d x 3"w columns) can be used throughout the store for most types of storage.

2.3 Abuse Resistant Uprights (Double Post Uprights)

2.3.1. Abuse Resistant Uprights with two, extra heavy-duty 3"d x 3"w columns are to be used in the Receiving area and with extra heavy product categories (see ***Section 8, Product Storage***), unless store was already existing and permitted with only heavy-duty uprights.

2.4 Gutless Uprights

2.4.1. **Never place pallets, molding, or extra heavy product categories on gutless uprights** (see ***Section 8, Product Storage*** for list of extra heavy product categories).



2.5 Galvanized Uprights

2.5.1 Outside garden and areas without canopies must have fully galvanized uprights.

2.6 Upright Installation

2.6.1. Pallet racking must be installed on concrete slab only. Installation on asphalt is strictly prohibited

2.6.2. Uprights must be vertically plumb (applies to all vertical planes—front, back, sides) - no more than 1/2" lean in 10'-0" of height, 5/8" in 12'-0", or 3/4" in 16'-0" of height.

2.6.3. Racks must never be connected to any part of the building structure.

2.6.4. Shims are the acceptable solution to plumb uprights under the following conditions:

a. Shims must be supplied or recommended by the racking manufacturer.
b. The shape of the shims must match the shape of the base plates.
c. Shims with dimples must be installed with the dimple facing upward to "lock" into the dimple of the base plates.
d. The maximum height of multiple shims that are not welded together is 1-1/2 times the anchor diameter. This applies to standard upright applications and uprights with galvanized inserts.

Table No. 2	Anchor Diameter	Max Shim Height (not welded)
Non-seismic	1/2"	9/16"
Seismic	1/2"	3/4"

2.6.4

e. A maximum height of 2" is allowed if shims are welded together by a certified welder. This applies to standard upright applications only, not with galvanized inserts.

2.7 Upright Column Protectors

2.7.1. All Heavy-Duty Uprights (3"d x 3"w columns) with potentially heavy forklift traffic or bulk storage in the aisle must have column protectors bolted to the front upright column.

2.7.1

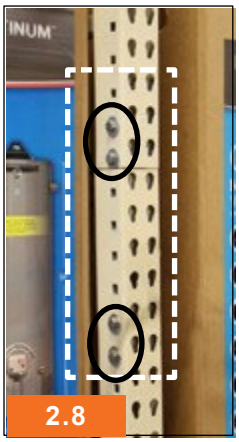
2.7.2 All Abuse Resistant Uprights (double, extra heavy-duty 3"d x 3"w columns) must have column protectors bolted to the front upright column.

2.7.3. All endcaps must have column protectors.

2.7.4. **NEVER** have an upright without a column protector on the racetrack or in D21,D22,D23,D28.

2.7.5. **Always reinstall column protectors during resets.**

2.8 Upright Extensions



2.8.1. No new installations or movement of upright extenders are permitted. Approved upright extenders may be installed only for signage and/or product restraints but these must be installed by a certified contractor only.

2.8.2. Never use full upright extenders or single column extenders on racking with extra heavy product categories (see ***Section 8, Product Storage***).

2.8.3. Never use full upright extenders or single columns extenders with gutless uprights.

2.8.4. Never extend Heavy Duty or Abuse Resistant Uprights beyond 16'-0" total height. Only one level of 4'-0" upright extenders may be used.

2.8.5. Never extend duty uprights (1 5/8"d x 3"w columns) beyond 12’-0”.

2.8.6. 4'-0" upright extensions must be joined with the proper size of insert sleeve and bolted with a minimum of four(4) ½” Grade 5 bolts per column (eight per upright) - two (2) above the connection and two (2) below the connection (see **image 2.8**).

2.8.7. Ensure that extenders are installed right-side-up and that the hole pattern on the front of the extender matches the front hole pattern uprights.

2.8.8. Though beams may be placed on upright extenders, never place wire decking or wooden stickers on beams supported by the extenders.

2.9 Upright Base Plate Inserts

2.9.1. Each front and rear post must be secured with four (4) ½” x 3- ½ “ Grade 5 bolts.

2.9.2. Insert baseplate must be anchored as required by seismic calculations or must match existing anchor.

2.9.3. Ensure the beams and uprights are level.

NEW

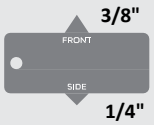
2.10 Upright Maintenance

Quick Reference

2.10.1.

Racking Damage can be assessed on uprights by using the upright dent Measuring Device.

Insert the point of the Upright dent into the center of the dent. Use the 3/8'' point for the front of the upright and the ¼" for the side. If the indicator point fits into the dent and the sides are flush with the upright, the racking must be replaced.



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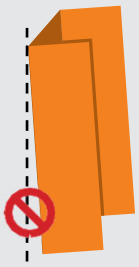
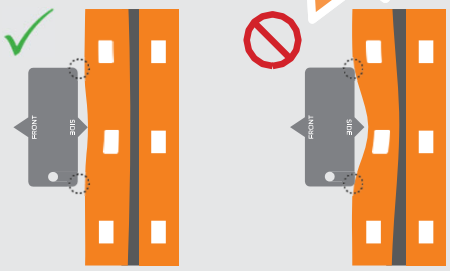


- **Twisted or moved more than ¾ of an inch.**



- **More than ⅜ of an inch damage to the front or ¼ of an inch damage to the side.**

2.10.2. An upright is considered severely damaged if it is dented on any side more that 3/8'' deep and more than 2'' in diameter. This upright must be replaced.

2.10.3. An upright is considered severely damaged if a column is twisted to a degree that one or both corners of the front of the column are permanently pushed out of place by more than 3/4". Replacement is not necessary if the column returns to its normal shape after removal of loads and beams.

2.10.4. Replace upright with excessive rust on upright columns. Excessive rust is defined as the thickness of a dime or greater and an area 2" in diameter or greater.

2.10.5. An upright is considered severely damaged if there are any visible cracks or breaks in the welds between columns and struts (i.e. "H" or "Z" braces). This upright must be replaced.

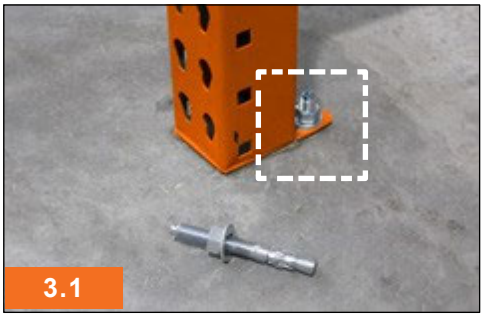
2.10.6. Replace upright if any horizontal or diagonal strut (i.e. "H" or "Z" brace) is bent more than 3/4" out of alignment.

2.9.5

NOTE: If there is damage to upright racking that creates an unstable system see *Scope of Standards, Section 1.4* for steps on how to handle.

3.1 Anchor Installation

3.1.1. While stores may reset pallet racking less than 4 ft tall, no anchoring is permitted by store associates. All anchors must be installed by a Qualified Contractor. For new store applications, Qualified Contractors are responsible for verifying code compliance prior to anchor installation.



3.1.2. To report an anchor damage or maintenance issue refer to page 1, lines 5 and 6.

3.1.3. Refer to the "Stores with Seismic (Earthquake) Racks" section of this document for additional anchoring requirements for stores in seismic areas.

3.1.4. All uprights over 48" high (including endcaps) require anchoring both front and rear columns to the slab with ICC-ES anchors satisfying Acceptance Criteria AC 193 for cracked and un-cracked concrete. Minimum embedment is six times the anchor diameter or the minimum embedment as required by the manufacturer. Anchor length must account for the minimum embedment and the added thickness of shims. Anchors must be installed a minimum of 3" from construction joints and control joints.

Table No. 3	Anchor Diameter (minimum)	Embedment (minimum)
Non-seismic	1/2"	2-1/4"
Seismic	1/2"	3"

3.1.5. Anchor washers are not required unless either specified or provided by the anchor manufacturer.

3.1.6. Qualified Contractors must follow manufacturer's recommended anchoring detail if they exceed the criteria noted above. (Racking engineer, state and local code authorities, and racking manufacturers may exceed THDRS rules).

NOTES: The length of the expansion type stud anchor should be ordered to allow for expected shimming, the base plate thickness, a washer, nut and a minimum 1/8" projection of the stud beyond the nut. The hole should be drilled to a depth at least a diameter of the anchor deeper than required to allow the anchor to pull up as it is torqued and set.

3.2 Anchor Maintenance

3.2.1. Qualified Contractors must replace damaged anchors with the anchors of the same design—length, diameter type—except in damaged concrete applications. All additional THDRS anchoring rules apply.

3.2.2. Damaged anchors that need to be replaced where there is also damage to the concrete must have the concrete repaired and epoxy anchors are to be used.

3.2.3. When replacing damaged uprights, Qualified Contractors are to adhere to current anchoring requirements for replacement uprights, i.e. no “perimeter anchoring.

4.1 Beams & Shelf Levels

4.1.1. A shelf level is defined as a pair of beams that are installed at the same height (front and rear).

4.1.2. All shelf levels with beams 75" long or longer that receive pallets must have either Heavy Duty or Abuse Resistant Uprights that are 42" deep or deeper and use 5" high beams or greater. Extra heavy product categories require Abuse Resistant Uprights (see ***Section 8, Product Storage*** for list of extra heavy product categories).

4.1.3. Racking with 51" long beams can have all 3" high beams (including the top shelf level) regardless of upright type, height or depth. No pallet storage with 24" to 36" deep uprights. Pallet storage is allowed with 42" or 48" and deeper uprights.

4.1.3.a

a. Pallets are required to rest on both the front and back beam. The bottom deck board must rest on the front beam and pallets should not overhang the front beam by more than 4".

4.1.4. All bays require a minimum of two shelf levels spaced a minimum of 24" between beams except:

a. All bays with up to 96" high uprights and approved flex-walls of the same or nearly same height as the uprights are allowed to have only one shelf level at floor level (ex. 88" high flex-wall in a 96" high bay, 44" high flex-wall in a 48" high bay, etc).

b. Racking with 48" high uprights can have only one shelf level at the top of the uprights provided there is a rear beam at approximately 18" off the floor and all beams (front and rear) are bolted with Grade 5 bolts.

4.1.5. The top shelf level must have 5" high or greater beams unless otherwise noted in the *Racking Standards*.

4.1.6. If the distance between shelf level beams is more than 36", the lower of the two shelf levels must have 5" high beams or greater unless otherwise noted in *Section 4.1 of the Racking Standards*.

4.1.4.

4.1.7. Shelf levels can have 2" beams, regardless of upright type, height or depth, provided that space between shelf levels is less than 24". Never use 2" beams for the top shelf level. 2" beams are no longer orderable. **No pallet storage - no exceptions**.

Beams & Shelf Levels – Continued

4.1.8. Shelf levels that support an in-bay fixture can have 3" beams, regardless of upright height or depth, provided

a. Fixture spans the width of the bay.
b. Fixture is secured to the bay.

And one of the following applies:

a. Fixture/shelf level does not store products offered for sale and sample products, if any, are secured to the fixture or;
b. Fixture/shelf level prevents hand stacked products offered for sale from being stored more than 36" deep in the bay or,
c. Fixture/shelf level prevents hand stacked products offered for sale from being stored more than 36" high in the bay.

4.1.9. Racking with 24" to 36" deep uprights, regardless of upright type or height, can have all 3" high beams regardless of beam length except the top shelf level, which must have 5" or greater beams**. No pallet storage - no exceptions.**

4.1.10. Gutless racking and V-rack, regardless of upright height or bay depth, can have all 3" high beams regardless of beam length except the top shelf level, which must have 5" or greater beams. **No pallet storage - no exceptions.**

4.1.11

4.1.11. Safety retainer beams, other non-load-bearing beams, and beams installed at floor level can be 3” high beams.

4.1.12. A bolted rear beam (Grade 5 bolts) set approximately 18” off the floor is required if the lowest shelf level is higher than 52” from the floor to top of beam. In double and triple deep bays, only the rear bay is required to have a beam set approximately 18” off the floor.

4.1.13. All racking with 192" (16'-0") high uprights must have the lowest shelf level no higher than 120" (10'-0") from the floor to top of beam. All other THDRS rules apply. Existing racking above Receiving dock doors must have the lowest shelf level at 126" (10'-6") from floor to top of shelf.

4.1.14. Beams 126” long must be 6” high or greater (minimum 14-gauge steel).

4.1.15. Beams 156" long must have either hot rolled channel beams 7" high or greater or reinforced beams 9" high or greater for extra heavy product categories (see ***Section 8, Product Storage***). Standard 6" cold form beams are acceptable for other product categories (must not exceed 4500 lbs. per shelf level).

Beams & Shelf Levels – Continued

4.1.16. Endcaps are not to be any wider than the combined depth of the adjacent back-to-back racking plus 3” (i.e. endcaps are not to extend past the adjacent racking by more than 1-1/2” on either side of the endcap).

4.1.17. Outside Garden and areas without canopies must have galvanized beams.

4.1.18. Slotted beams (beams with a series of holes in the top of the beams) are not to be used in any exterior application such as the Outdoor Garden Center. Galvanized beams with a rectangular slot (approximately ¾" x 1") on the front or back are acceptable (one slot per beam to accommodate manufacturing process).

4.1.19. **NEVER** drill holes or self-tapping metal screws into beams. The drilling of holes in the face of the beam or upright reduces the cross-sectional area, thereby reducing its load-carrying capacity. While small-diameter holes spread out over a beam cause moderate damage to the beam, closer and high-density holes (Table No. 4) can significantly reduce the load-carrying capacity of the beam.

A beam is considered severely damaged and should be replaced if there are four or more 3/16-inch diameter holes within a 1-inch circle.

Table No. 4	Moderate Damage	Severe Damage
Damage Severity	No more than three 3/16" diameter holes within a 1" diameter (dia.) circle.	Four or more 3/16" diameter holes within a 1" dia. circle.

4.1.20. Angled base beams are to be installed at floor level only unless required by local code and approved by the engineer of record.

.

4.2 Securing Beams

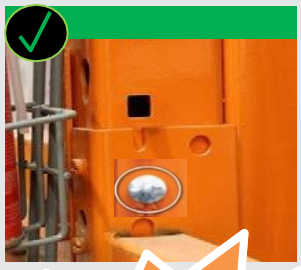
4.2.1. All beams must be free of visible damage to studs (pins).

NOTE: Visible damage includes but is not limited to evidence that studs are deformed in a manner that prevents the beam clamp (bracket) from firmly seating into the upright slots, or studs that appear to be pulling through or separating from the bracket, or studs that are missing entirely.

4.2.2. All beams, front and rear, must comply with one or both of the following:

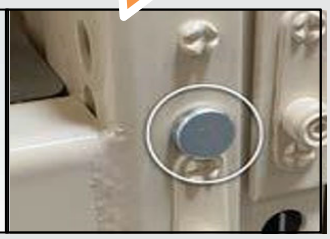
a. Must have engaged and operable, manufacturer-supplied beam locking device. Note: safety clips with sliding or gravity locking pins are acceptable if they prevent removal by customers.

b. All front beams that have engaged and operable beam locking devices must be bolted to uprights (regardless of upright height) with either Grade 5 bolts or J-Pins on both sides of the beam (see figure 4.2.2). This reduces the risk of the beam being dislodged by lift equipment resulting in beam failure. If manufacturer-supplied beam locking device is missing or damaged, a Grade 5 bolt with nut must be installed. ***Note***: Bolting above the beam bracket is not acceptable means of securing beams that do not have operational locking devices.



Quick Reference

Grade 5 Bolt



Magnetic J-Pin

Note: Existing Box Bolts are still approved but replacements are no longer available

4.2.3. All beams (stand-alone) that use accessories that support weight (i.e. tool holders, cantilever-style shelving, etc.) may use 3" high or greater beams if the device extends 30" or less from the beam. Devices that extend more than 30" from the beam require 5" high or greater beams. M-bars can use 3" beams regardless of the depth of the m-bar because loads are side-to-side instead of downward. Beams are to be bolted to the uprights with Grade 5 bolts (J-pins not allowed). **No pallet storage, no exceptions, for cantilever-style shelving.**

Securing Beams – Continued

4.2.4. All rear beams must have either engaged and operable safety clips or must be bolted to uprights with Grade 5 Bolts where no operable safety clips.

4.2.5. All Safety retainer beams are to be bolted to uprights with Grade 5 bolts or magnetic J-Pins.

4.2.6. All beams, front and rear, with extra heavy product categories (see ***Section 8, Product Storage***) must be bolted to uprights (regardless of upright height) with Grade 5 bolts or magnetic J-pins.

Best Practices for proper bolting:

Option A

- **Grade 5 bolt (with nut) through the flange and upright.**

Option B

- **Magnetic J-Pin through the flange and upright.**

Quick Reference

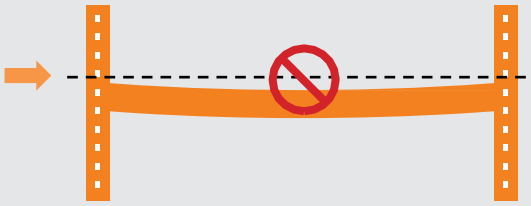
4.2.7. J-pins are not approved to be used on flex-walls, wall-mounting arms, or any cantilevered arms that support tools or other fixtures.

4.3 Beam Maintenance

4.3.1. Replace beams that have been punctured by lift equipment.

4.3.2. Replace beams if the sag is more than identified in **Sections 4.3.4** to **4.3.6**.

- **Beam sag can be measured by running a string across the bay with the string touching both beam ends. Measure the distance between the string and the middle of the beam.**



NOTE: If there is damage to upright racking that creates an unstable system see *Scope of Standards, Section 1.4* for steps on how to handle.

4.3.3. Replace beams when permanent downward deflection (without a load) is greater than the length of the beam divided by 180 (beam length/180) or approximately:

- **3/8"** on 75" beams
- **1/2"** on 87" to 102" beams
- **5/8"** on 108" beams
- **3/4"** on 126" beams
- **7/8"** on 156" beams

4.3.4. Replace beams when the permanent inward deflection (without a load) is greater than the length of the beam divided by 240 (beam length/240) or approximately:

- **1/4"** on 51" to 75" beams
- **3/8"** on 87" to 102" beams
- **1/2"** on 108" to 126" beams
- **5/8"** on 156" beams

4.3.5. Replace beams with excessive rust, which is defined as the thickness of a dime or greater and an area of more than half of horizontal surfaces (top and bottom) or more than ¾ of the height of vertical surfaces (front and back) of a beam.

5.1 Shelf Rails

5.1.1. A shelf rail, also referred to as a 1-inch beam or slim beam, is being used more often for displaying merchandise in lower levels of racking in certain departments.

5.1.1

NEW

5.1.2. Shelf rails must meet the following requirements:

a. Cannot be used in D21, D22, D23, and D28O.

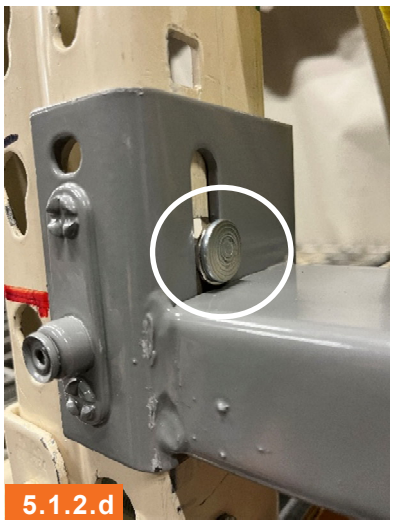
b. May only be used where called out specifically in the plan-o-gram (POG).

c. Must never be used at heights over 8 feet.

d. Grade 5 bolts or J-pins are to be installed with these rails.

e. Max weight of 1,000 lbs. per shelf (must be uniformly loaded across beam).

f. Must only be used for hand-stacked product. **No pallet storage!**



5.1.2.d

5.1.2.e & f

6.1 Pallet Stops Standards

6.1.1. Pallet stops (vertical safety columns) are required for all pallet racking 120” (10-0") tall or taller, regardless of bay depth, including when against building walls and fence lines in Outside Garden.

The only exceptions are:

- At endcaps.
- When using back-to-back V-Rack.
- When against cantilever (pallet stops are required if pallet racking is taller than the cantilever it backs up to).
- Receiving where we have chain link fencing.

6.1.2. One 13'-0" pallet stop **must be installed** for each pallet position in the flue space between back-to-back pallet racking and at free-standing pallet racking (i.e. pallet racking backed up to displays or bulk stacked merchandise).

6.1.3. Pallet stops **must extend** a minimum of 12" above the uprights. When 16'-0" racking backs up to 12'-0" racking, the pallet stops are to be installed 12" above the uprights of the 16’ racking,

6.1.4. Pallet stops **must be secured** using two brackets bolted to the beams (front or back of beams only). Attach pallet stops to existing beams in each bay - do not install additional beams solely for the purpose of attaching pallet stops.

6.1.5. Installing rear offset beams above all shelf levels is an acceptable alternative to pallet stops when interference in the flue space precludes the use of pallet stops (i.e. sprinkler pipes).

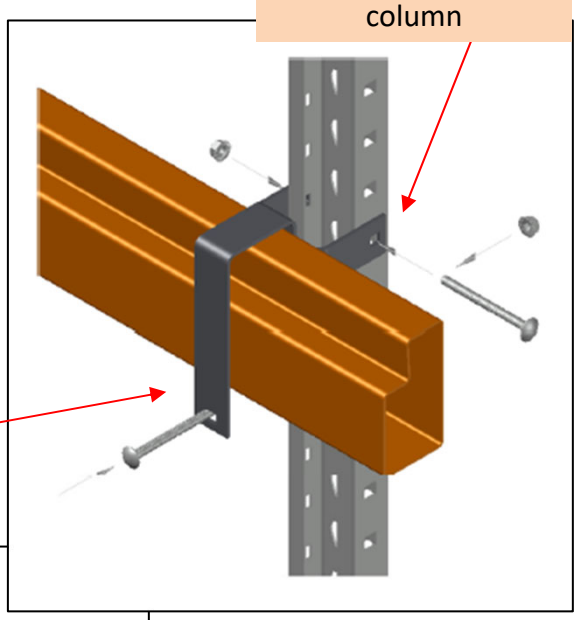
6.1.6. Store / MET associates are allowed to install pallet stops and adjust pallet stop brackets.

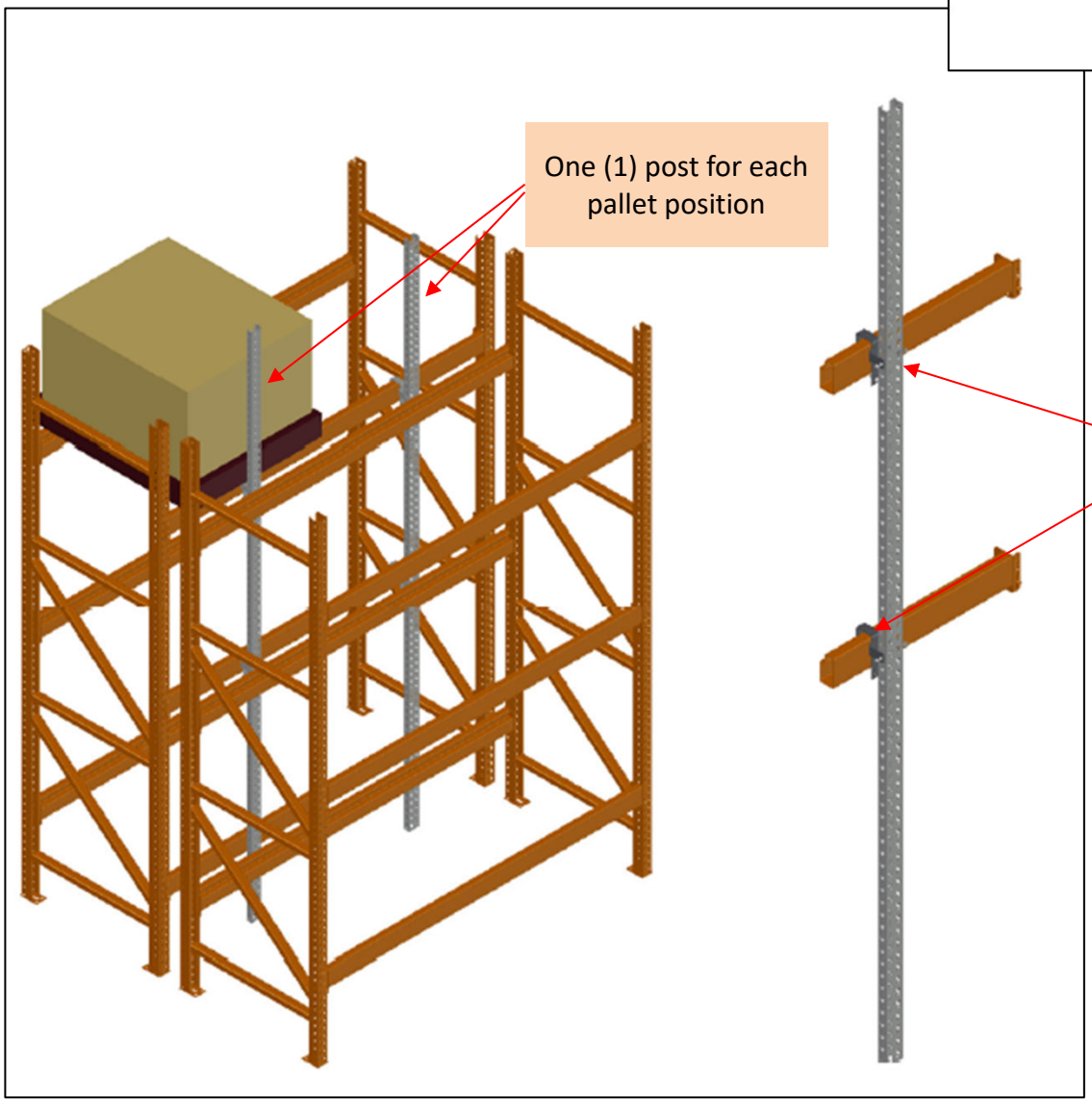
6.2 Pallet Stops Standards – Installation Guidelines

6.2.1. Pallet stops must be secured using two (2) brackets bolted to the front and back beams.

6.2.2. Hardware required:

- Two (2) 3/8 x 4” carriage bolts with whiz nuts

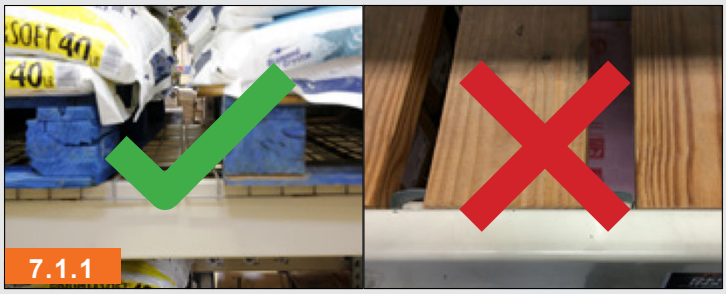




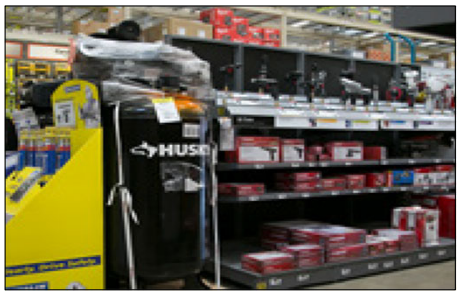
7.1 Deck & Crossbar Installation

7.1.1. All shelf levels at 96" (8'-0") high and above that need decking must use wire decking — NO wood stickers!

Quick Reference

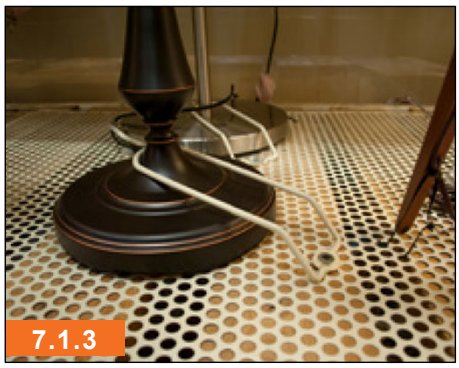


7.1.2. Except for base (floor) shelf levels (below 6"), all shelf levels below 96" (8'-0") must have either wire decking or wood stickers spaced 2" apart to allow for water flow in case of fire. This holds true for the versa racking and 2" beams. Metal spacer strips (sticker spacers) must be used to ensure spacing compliance. Sticker spacers must be installed vertically on the step of the beam to prevent them from falling off. Base (floor) shelf levels can have wood stickers without metal spacers provided space between wood stickers is minimal (tight).



7.1.3. Fire Department approved perforated metal decking (minimum 40% opening) are permitted up to 60" from the floor. Perforated metal decking is required for merchandise that could fall through the 2" spaces of the wood stickers (slab doors, windows, standup stick goods, etc.)

7.1.4. Any softwood species that is commercially graded as #3 or better is acceptable for use as wood stickers. Knots must not exceed 75% of the board width.



Decking & Crossbar Installation – Continued

7.1.5. Pallets must span both front and rear beams.

7.1.6. Extra heavy palletized product *(see **Section 8, Product Storage**)* must have waterfall wire decking with integrated crossbars for each pallet position.

7.1.6

7.1.7. Waterfall wire decking with integrated crossbars do not need to be screwed down to beams.

7.1.7

7.1.8. Wire decking is always an acceptable alternative to wood stickers.

7.1.9. Integrated wire decking is to be used in place of wood stickers when there is a high potential of people walking on the decks (i.e. water heaters, tubs, rolled insulation, appliances, etc.).

7.1.10. Integrated waterfall wire decking can be modified to accommodate building columns or other obstructions provided that crossbars are intact.

7.1.8

7.1.11. Flush insert wire decking is acceptable for hand stacked product - no modification - no pallet storage - no exceptions.

7.1.12. Wherever Shingles and Rolled Roofing / Felt and Roof Coatings are merchandised, all shelf levels are to have integrated waterfall wire decking due to the flammability of the merchandise.

7.1.11

Decking & Crossbar Installation – Continued

7.1.13. All Outside Garden racking is to have galvanized (zinc) wire decking.

7.1.14. Pegboard or solid sheet goods are not to be used in any horizontal application.

7.2 Deck Maintenance

Replace integrated wire decking if:

- There is any cut steel that is likely to cause bodily harm.
- There is any damage to the deck that interferes with loading or unloading product or would cause product damage.
- There are any missing or broken wire deck channels.
- The decking has excessive rust.

NOTE: To extend the useful life of damaged wire decking, it is acceptable to rotate wire decking 180°.

8.1 Extra Heavy Product

8.1.1. Is the product **Extra Heavy Product** (2500 lbs. or greater pallet weight)?

Examples:

- Flooring (tile, laminate, ceramic, wood)
- Brick or block
- Pavers
- Sheetrock mud
- Stone (including bagged)
- Bagged garden products
- Bottled Water
- Salt
- Roofing materials (roofing, flashing, shingles, rolled felt, etc.)
- Concrete products (cement, sand, etc.)

Pallets must be in good condition

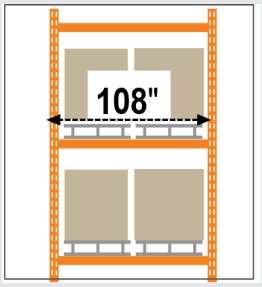
Ensure palletized merchandise is placed on an approved, stable pallet, securely stretch-wrapped **(3 wraps to all four corners of the pallet)** and/or banded to the pallet in accordance with stretch wrap standards.

Quick Reference

8.1.2. **Extra heavy Product** must be placed in an overhead with the following characteristics:

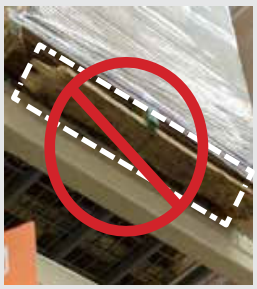
Double Post / ARU – no damaged racking

The beam is 5” or greater *



Bay width is no greater than 108”

The **front AND rear** beam has grade 5 bolts or J-pins



Pallet will not have greater than 4” of overhang

8.1.3. If there is NO overhead space that fits the above criteria, product should be stored on the floor following the **Merchandising Safety Standards**.

8.1.4. If all floor space is full**, ONLY ONE PALLET** of **Extra Heavy Product** may be placed in a single bay with all the characteristics as defined in *8.1.2* with the exception that these are allowed to go in single post upright racking.

**EXCEPTION: Bay widths of 51” only have 3” beams and are allowed to have Extra Heavy Product*

Single Post – no damaged racking.

9.1 Cantilever Installation

9.1.1. No installations or repairs are permitted by store associates.

9.1.2. Extra Cantilever racks may not be modified or “maintained” by store associates. This includes, but is not limited to, relocation of arms, replacement, or welding, etc. of any components of the cantilever system. All modifications must be made by Qualified Contractors with the training and equipment required to deal with this material. In the event of substantial damage, the rack must be unloaded until Qualified Contractors can repair it. To report damage or maintenance issues refer to page 1, lines 5 and 6.

9.1.3. Cantilever may only be installed on concrete floor or slab. Installation on asphalt is strictly prohibited.

9.1.4. Cantilever must have at least one anchor in the column and one anchor in each base. This applies to single and double sided cantilever and for both seismic and non-seismic applications. Use ICC-ES AC-193 compliant expansion anchors for cracked and un-cracked concrete with a minimum embedment of six times the anchor diameter. Anchor length must account for the minimum embedment and the added thickness of shims.

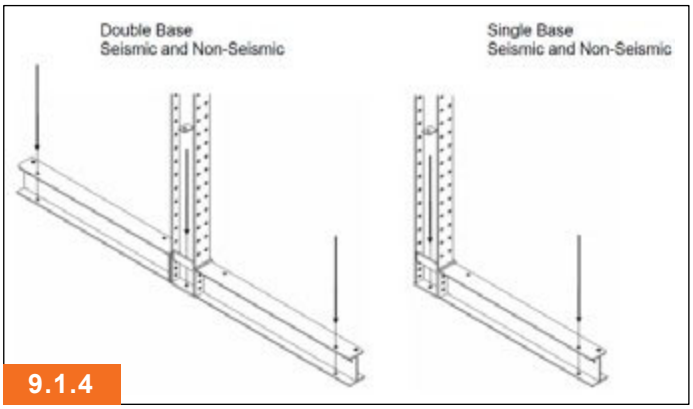
NOTE: An alternative is two anchors in each base on single side runs or one anchor in each base on double sided runs. This alternative is acceptable in older stores where this anchor pattern was previously used.

Anchors must be installed a minimum of six diameters from construction joints (does not apply to control joints). If the location of a construction joint prevents placement of an anchor in the column, then install the anchor in the base. This applies to both seismic and non-seismic applications.

Table No. 5	Anchor Diameter (minimum)	Embedment (minimum)
Seismic and Non-seismic	5/8"	3-3/4"

Cantilever Installation – Continued

9.1.4. *(Continued)* The drawing below is for illustrative purposes only – anchor patterns may be reversed / mirrored. Qualified Contractors are to follow manufacturer's recommended anchoring detail, including torque requirements.



9.1.4

9.1.5. Bracing must be in every bay. Bracing consists of alternating patterns of cross and horizontal bracing (i.e. "X" and "H" bracing):

- Bracing for 166" and 192" columns: start the first bay with an "X" brace in the lower brace panel and one horizontal brace in the upper brace panel. The next bay will have three H braces. Repeat this pattern for the entire cantilever run. The last bay must have an "X" brace even though the run may end with two "X" brace bays adjacent to each other.
- Bracing for 148" columns: start with an "X" brace in the first bay. The next bay will have two "H" braces. Repeat this pattern for the entire cantilever run. The last bay must have an "X" brace even though the run may end with two "X" brace bays adjacent to each other.

9.1.6. All bracing must be bolted with Grade 5 bolts and nuts (maximum 1/8" smaller than hole diameter) – wrench tight. Bolts must be of the following specification: ASTM A325 SAE Grade 5 with the added specification that the bolts satisfy ASTM A153 and ASTM Practice 143 regarding mitigation of hydrogen embrittlement.

9.1.7. Structural arms must have four 3/4" x 2" Grade 5 bolts and nuts in the arm plate. Follow the manufacturer's recommendation for roll-formed arms. Bolts must be installed using an impact wrench and torqued to a minimum of 200 ft/ lbs. Bolts must be of the following specification: ASTM A325 SAE Grade 5 with the added specification that the bolts satisfy ASTM A153 and ASTM Practice 143 regarding mitigation of hydrogen embrittlement

Cantilever Installation – Continued

9.1.8. Column to base connection must have six ¾" x 2" Grade 5 bolts and nuts. Bolts must be installed using an impact wrench and torqued to 200 ft/lbs. Bolts must be of the following specification: ASTM A325 SAE 1080 Grade 5 with the added specification the bolts satisfy ASTM A153 and ASTM Practice 143 regarding mitigation of hydrogen embrittlement.

9.1.9. *Only use new Grade 5 bolts on cantilever installs and repairs*

9.1.10. Arm plate **must be bolted** flat against the face of the column.

8.1.10

9.1.11. Arms are **never to be installed** on a cantilever column without a base below (on the same side).

9.1.12. Columns are to be vertically plumb – with no more than 1/2" lean in 120" (10"-0") of height of ¾" in 192" (16"-0") of height.

9.1.13. Multiple shims may be used under each base to ensure the column is plumb. Multiple shims that are not welded together are limited to a maximum height equal to 1-1/2 times the diameter of the anchor used.

Table No. 6	Anchor Diameter	Maximum Shim Height (not welded)
Seismic and Non-seismic	5/8"	15/16"

Cantilever Installation – Continued

9.1.14. A maximum shim height of 1" is allowed if multiple shims are both welded together and to the base by a certified welder

9.1.15. When shims are used for plumbing, a minimum embedment into the slab of at least six times the diameter of the anchor must also be achieved.

Table No. 7	Anchor Diameter (minimum)	Anchor Diameter Embedment (minimum)
Seismic and Non-seismic	5/8"	3-3/4"

9.1.16. A Palletized product may only be stored in cantilever racking if approved by Divisional Sr. EHS Manager and the approved crossbeams and decking are in place. Wood or plywood may not be used.

9.1.17. Wallboard (drywall or sheetrock) and reinforcing steel (rebar) must be stored at floor level only.

9.1.18. Any freestanding bulk stacks exceeding 8’ (when not backed up to racking or wall) must be in cantilever.

9.2 Cantilever Maintenance

9.2.1. Replace double-sided columns if the column flange is bent more than twice the flange thickness.

9.2.2. Replace a column if a flange is bent more than the flange at the point of connection to the base (applies to a single and double-sided columns).

9.2.3. Realign undamaged columns that have rotated (pivoted) out of alignment by loosening connecting cross braces, rotating the column into position, checking anchor condition and torque, and retightening connecting braces.

9.2.4. Realign Replace a base if the bottom flange does not lie flat on the floor unless the damage is limited to the first 12” from the end of the base nearest the aisle.

9.2.5. Replace a base if the top flange is bent up or down more than 1-1/2’’. Replacement is not necessary if the damage is limited to less than 12’’ along the base flange nearest the aisle. It is acceptable to reshape (hammer or grind) the top flange into position if damage is less than 1-1/2’’ (up or down).

Cantilever Maintenance – Continued

9.2.6. Replace a base if there is a separation between the base and the column that exceeds the thickness of the bolt plate. Gap must be fixed even if the base is not replaced.

9.2.7. Replace a base if there is a separation between the base and the column that exceeds the thickness of the bolt plate. Gap must be fixed even if the base is not replaced.

9.2.8. Replace an arm if skewed more than 6" off center (without a load and not due to the column being skewed).

9.2.9. Replace an arm if there is a permanent negative (downward) deflection of less than 1/8" positive slope per foot.

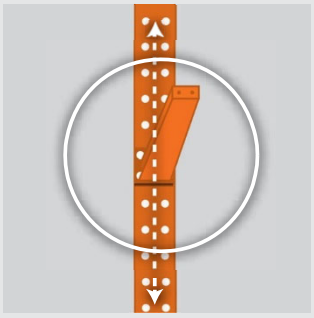
9.2.10. Replace an arm or base if there are visible cracks present where the arm or base is welded to the bolt plate.

9.2.11. Replace lumber safety poles if there is >2" deflection over length.

9.2.12. Always inspect cantilever racking for skewed, bent, or improperly installed arms.

Quick Reference

Never do the following:



- **Never** place the product if the arm is more than 6" off center without a load and not due to the column being skewed.

- **Never** place product on the arm that has a permanent downward deflection and does not make contact with the load.

- **Never** place product on arms that are not on the same level for each of the merchandising positions.

- **Never** allow stickers to rest on cantilever racking or not cover 3 arms per unit.

Remember: No moves, installations, or repairs of cantilever uprights or arms are permitted by store associates. If any issues are found place a FIXIT request. (Refer to 1.6)

10.1 Standards for Seismic Stores

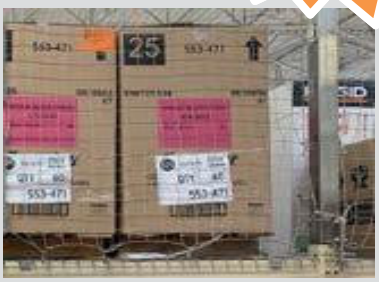
Quick Reference

10.1.1

High bay netting is **required** for all seismic stores.

At a minimum, the following categories **MUST** be restrained by netting if hand-stacked in the top overhead:

- D23 Trowels
- D25 All hand stacked merchandise
- D26 Faucets/Shower heads
- D28 Cleaning chemicals
- D29 Vanities/Cabinets stacked 2 high less than 48”
- D59 Blinds



Free & Clear Netting

10.1.2. Some stores in the lower seismic areas may have earthquake resistant racks even though it is not required to have them. The engineer of record for each store may make exceptions to these rules on a case-by-case basis.

10.1.3. Abuse Resistant Uprights are required for all extra heavy product categories (see ***Section 8, Product Storage***) in the non-seismic rack areas. Heavy Duty Uprights and gutless uprights are not permitted to support these loads.

10.1.4. All Uprights may not be extended without Corporate Safety or Legal department approval or direction.

Note: **Refer to the Safety page on myApron for the current *Seismic Stores List*.**
MyApron>> Departments>> Safety

Stores that are in higher seismic areas require special earthquake resistant racks and have additional installation requirements.

Standards for Seismic Stores – Continued

10.1.5. All uprights over 48" high (including endcaps) require anchoring both front and rear columns to the slab with ICC-ES AC-193 compliant anchors (refer to the manufacturer's approved ICC report) for cracked and un-cracked concrete, with a minimum embedment of six times the anchor diameter. Anchor length must account for the minimum embedment and the added thickness of shims. Anchors must be installed a minimum of six diameters from a construction joint (does not apply to control joints).

10.1.6. Use one anchor per column where the holes in the base plate are less than 4" apart and use two anchors where they are more widely spread.

.

10.1.7. Contact the engineer of record if anchors are being questioned by the local building department.

Table No. 8	Anchor Diameter (minimum)	Embedment (minimum)
Non-seismic	1/2"	2-1/4"
Seismic	1/2"	3"

10.1.8. In general, row spacers are required wherever it is possible to fit them. However, endcaps are never to be tied to the adjacent racks. Keep at least 3" of clearance between the endcap upright and the racks behind it.

10.1.9. Racks must never be connected to any part of the building structure. Any existing connections between the racks and buildings must be removed.

10.1.10. Copies of all racking related documents should be kept on site for reference. Beam levels must conform to the approved drawings for the specific store. All bays must have a minimum of two shelf levels *(see Section 4: Beams)*.